



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0297984

THE APPLICATION OF ENTERPRISE PRODUCTS OPERATING LLC FOR AUTHORITY PURSUANT TO RULE 9 AND RULE 36 TO DISPOSE OF OIL AND GAS WASTE CONTAINING HYDROGEN SULFIDE INTO ITS REESE CLEVELAND GAS UNIT WELL NO. 2, WAHA (CHERRY CANYON H₂S-DISP) FIELD, REEVES COUNTY, TEXAS

EXAMINERS REPORT AND RECOMMENDATION

HEARD BY: Richard Eyster, P.G. – Technical Examiner
Marshall Enquist – Administrative Law Judge

Appearances:

Tim George
James Clark

Representing:

Enterprise Products Operating LLC

PROCEDURAL HISTORY

Application Filed:	August 28, 2015
Date of Hearing:	October 08, 2015
Conference Date	December 8, 2015

STATEMENT OF THE CASE

Enterprise Products Operating LLC ("Enterprise") is seeking authority to inject acid gas into the proposed disposal well, the Reese Cleveland Gas Unit Well No. 2, (Well-2) in the Waha (Cherry Canyon-H₂S Disp) Field. This field was approved in 2006 and there is currently two acid gas disposal wells carried in the field. The two existing disposal wells are the Regency Gas Services Waha, LP Waha Plant No.10 and the Reese Cleveland Gas Unit Well No. 1. The Regency well is approximately one mile north of the proposed injection well and the Reese Cleveland well is located at the South Plant a little over one-half mile south of the proposed North Plant and the proposed injection well.

The existing gas treatment plant is the Waha Plant No. 1 (South Plant) receives and compresses sour natural gas (H₂S) from the low pressure Gomez gathering system and the high pressure Monahans gathering system and will route it to the new North Plant for treatment. The North Plant will receive and treat sour gas from additional second party pipelines. The acid gas will be injected into the proposed injection well.

Enterprise's expert witness, James Clark P.E. stated during the hearing that the South Plant is operating at maximum capacity so Enterprise is building a new plant (North Plant) to handle the increase in gas volume due to increased drilling and production in the area. Enterprise is proposing to drill a new injection well, the Reese Cleveland Gas Unit Well No. 2, to handle the increased demand.

Statewide Rule 36(c)(10)(A) requires that a public hearing be held before the injection of fluid containing hydrogen sulfide ("H₂S" or "sour gas"), when "injection fluid is a gaseous mixture where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or, if the 100 ppm radius of exposure is 3,000 feet or greater." In this case, the 100 ppm radius of exposure ("ROE") is greater than 3,000 feet and does not include any residences and includes one county road, County Road 101, (CR101). The 500ppm ROE includes no residences and one county road, CR101.

A contingency plan which incorporates the new plant and injection well will be submitted to the Commission's Field Operations Division when the requested disposal well permit is approved. The Commission's Technical Permitting staff had no objection to approval of the Rule 9 authority.

This application is not protested. The Examiners recommend approval of the Rule 9 and Rule 36 authority.

DISCUSSION OF THE EVIDENCE

The existing Waha treatment plant (South Plant) is 3.2 miles northwest of Cayanosa, Texas in Reeves County. This plant removes CO₂ and H₂S from produced gas is delivered to the plant from the high pressure system and from the low pressure system. The South Plant is operating at capacity. Enterprise therefore plans to construct a new plant, the North Plant, and inject the water and gas into the proposed Reese Cleveland Gas Unit No. 2 into the non-productive Cherry Canyon Formation.

The Reese Cleveland Gas Unit Well No. 2 proposed total depth will be 7,300 feet and the disposal interval will be in the non-productive Cherry Canyon Formation from 6,550 feet to 7,200 feet. The maximum permitted surface injection pressure is 2,160 psig and the maximum permitted injection volume is 1,000 BWPD with 20.0 MMCFD. The average daily injection volume is 500 BBLW/D with 8MMCF/D. The average surface injection pressure will be 1800 psi.

The Commissions' Groundwater Advisory Unit (GAU) has determined that the base of usable quality groundwater occurs from the land surface to a depth of 600 feet and the Rustler Formation which is estimated to occur from 1700 to 2,125 feet. The base of the Underground Source of Drinking Water (USDW) was also determined to be 2,125 ft.

Enterprise proposes the injection well be completed and operated as follows:

- The well will be completed at a total depth of 7,300 feet.
- Surface casing (13 3/8-inch) will be set to a depth of 2,200 feet, 50 feet below the BUQW and cement will be circulated to surface.
- Intermediate casing (9 5/8-inch) will be set to a depth of 5,000 feet with cement circulated to surface.
- 7-inch, 26# HCL-80 long-string casing will be set to 6,000 feet with 7-inch, 32# G3 long-string casing set from 6,000 to 7,300 feet, with cement circulated to surface.
- 3-1/2 inch L80 Duoline fiberglass lined Injection tubing will be run from surface to 6,330 feet and 3-1/2 inch G3-9 (VAMTOP) tubing will be run from 6,330 feet to 6,450 feet.
- A packer will be set at a depth of 6,450, 100 ft higher than the top of the injection interval.
- The injection interval will be from 6,550 to 7,200 ft into the lower portion of the Bell Canyon Formation and the Cherry Canyon Formation.
- The maximum daily injection volume will be 1000 BBLW/D and 20 MMCF/D,
- The average daily injection volume of 500 BBLW/D with 8 MMCF/D.
- The maximum surface injection pressure will be 2,160 pounds per square inch (psi).
- The average surface injection pressure will be 1800 psi.
- Injection is through 3 1/2 inch tubing on a packer set at 6,450 feet.
- Enterprise requests authority to dispose of a maximum of 1,000 barrels per day. This volume includes approximately 20.0 MMCF/D of acid gas (1.62% H₂S, 97.2% CO₂ and < 1% other gases) and approximately 1000 BBLW/D.

The 100 ppm radius of exposure ("ROE") is 3,756 feet and the 500 ppm ROE is 1,716 feet. These calculations are based on a maximum escape volume of 8.5 MMCFD and 33,000 ppm H₂S concentration. The 500 ppm ROE includes a portion of a county road, (County Road 101), (CR101). The 100 ppm ROE does not contain any residences

and only one county road, CR 101. A contingency plan for the plant has been completed and the subject well has been incorporated into that plan. The plan will be submitted to the Commission for approval when the well is permitted and construction begins.

Applicants Exhibit No. 2, a map of the one quarter-mile area of review indicates there are no wellbores within one quarter-mile of the Reese Cleveland Gas Unit No. 2.

Applicants Exhibit No. 11 a cross section of four well logs indicate there is a 50 ft layer of shale immediately above the top of the injection interval and another shale layer from 7,300 to 7,400 effectively sealing the injection interval at the top and bottom of the injection zone. These shale layers will prevent the migration of the injectate out of the injection interval.

The disposal system is designed with numerous safeguards and the injection well will be shut-in if unusual conditions, such as low or high pressures or flow rates, are observed. Sensors will be installed throughout the area to detect any release of H₂S. The plant is manned on a 24 hour basis by personnel trained in H₂S safety. All equipment that will be subject to H₂S complies with NACE MR 0175.

FINDINGS OF FACT

1. Notice of Rule 9 application was sent to offset operators within ½ mile and to the Reeves County Clerk on July 30, 2015
2. Notice of this hearing to inject hydrogen sulfide was sent to all persons entitled to notice and was published on June 12, 2015 in the *Pecos Enterprise*, a newspaper of general circulation in Reeves County.
3. Enterprise Products Operating, LLC requests authority to inject fluids containing H₂S into the Reese Cleveland Gas Unit Well No.2. This waste gas is removed from hydrocarbon gas at the Waha treatment plant operated by Enterprise.
4. The Reese Cleveland Gas Unit Well No. 1 was permitted for disposal of plant effluent water from the South Waha Plant in 1983.
5. The Reese Cleveland Gas Unit Well No. 2 will inject plant effluent water and H₂S from the North Plant.
6. Enterprise requests authority to dispose of a maximum of 1,000 barrels per day. This volume includes approximately 20.0 MMCF/D of acid gas (1.62% H₂S, 97.2% CO₂ and < 1% other gases) and approximately 1000 BBLW/D.
7. The proposed Reese Cleveland Gas Unit Well No. 2 is completed in a manner which will confine the injected fluid to the permitted disposal interval and protect usable quality water.

8. The base of usable quality groundwater occurs from the land surface to a depth of 600 feet and the Rustler Formation which is estimated to occur from 1700 to 2,125 feet. The base of the Underground Source of Drinking Water (USDW) was also determined to be 2,125 ft.
9. There is a 50 ft layer of shale immediately above the top of the injection interval and another shale layer from 7,300 to 7,400 effectively sealing the injection interval at the top and bottom of the injection zone, preventing the migration of fluids into fresh water.
10. The injection well, compressor and flow lines transmitting sour gas, will be designed to contain the sour gas/produced water mixture, and monitoring devices will immediately shut down the system if any leakage of sour gas is detected.
11. The calculated ROE for 100 ppm H₂S due to a catastrophic release from the disposal well is 3,429 feet. The calculated exposure radius ROE for 500 ppm H₂S due to a catastrophic release from the well is 1,567 feet.
12. The 500 ppm ROE includes a portion of a county road CR 101 but no residences
13. The 100 ppm ROE includes no residences and one county road, CR 101.
14. There are no wellbores within ¼ mile of the Reese Cleveland Gas Unit No. 2.
15. The contingency plan for the plant, which incorporates the disposal well must be approved by Field Operations prior to beginning any injection activities.

CONCLUSIONS OF LAW

1. Proper notice was issued as applicable in all statutes and regulatory codes.
2. All things have occurred and been accomplished to give the Commission jurisdiction in this matter.
3. The application of Enterprise Products Operating LLC to inject hydrogen sulfide gas (acid gas) into the Reese Cleveland Gas Unit Well No. 2, in the Waha (Cherry Canyon-H₂S Disp) Field, Reeves County, complies with the applicable provisions of Statewide Rules 9 and 36.

EXAMINER'S RECOMMENDATION

Based on the above findings and conclusions, the Examiners recommends that the application of Enterprise Products Operating LLC be approved as set out in the attached Final Order.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'R. Eyster', with a stylized flourish at the end.

Richard Eyster, P.G.
Technical Examiner

A handwritten signature in blue ink, appearing to read 'Marshall Enquist', with a stylized flourish at the end.

Marshall Enquist
Administrative Law Judge